U.S. EPA Environmental Technology Verification Program
Advanced Monitoring Systems Center

Water Stakeholder Committee Meeting

May 21, 2002
Madison, Wisconsin

Meeting Minutes

ATTENDEES

Stakeholder Committee Members:

John Carlton, Alabama Department of Environmental Management, Mobile, AL
Christine Kolbe, Texas Natural Resource Conservation Commission, Austin, TX
Marty Link, Nebraska Department of Environmental Quality, Lincoln, NE
Alan Mearns, National Oceanic and Atmospheric Administration, Seattle, WA
Vito Minei, Suffolk County Department of Health Services/ Peconic National Estuary Program, Hauppauge, NY
Richard Sakaji, California State Department of Health Services, Berkeley, CA
Geoff Scott, NOAA, Center for Coastal Environmental Health and Biomolecular Research, Charleston, SC
Roy Spalding, University of Nebraska, Lincoln, NE
Peter Tennant, Ohio River Valley Water Sanitation Commission, Cincinnati, OH
Kenneth Wood, Dupont Corporate Environmental Engineering Group, Wilmington, DE

EPA/Battelle AMS Center Staff

Teresa Harten, U.S. EPA, Cincinnati, OH
Bob Fuerst, U.S. EPA, Research Triangle Park, NC
Elizabeth Hunike, U.S. EPA, Research Triangle Park, NC
Karen Riggs, Battelle, Columbus, OH
Jeff Myers, Battelle, Columbus, OH
Todd Peterson, Battelle, Seattle, WA

Guest Speaker:

William van der Schalie, U.S. Army Center for Environmental Health Research, Fort Detrick, MD

AMS CENTER WATER STAKEHOLDER COMMITTEE MEETING

The Water Stakeholder Committee of the U.S. EPA ETV program's AMS Center convened its May 2002 meeting in conjunction with the National Monitoring Conference 2002 in Madison, Wisconsin. The National Monitoring Conference is sponsored by the National Water Quality Monitoring Council.

Karen Riggs, Battelle's AMS Center program manager, opened the meeting by welcoming stakeholders and the guest speaker. Ms. Riggs pointed out the opportunity to discuss water quality monitoring technologies with participants in the National Monitoring Conference.

Teresa Harten, U.S. EPA's ETV Program director, expressed her appreciation to stakeholders for the contributions they make to the ETV program. Ms. Harten recognized Vito Minei as the Stakeholder of the Year for the AMS Center Water Stakeholder Committee. Mr. Minei's contributions include reviewing verification test plans and results, and presenting, at the committee's last meeting in Coeur d'Alene, Idaho, his agency's deployment of a multi-parameter water probe in the waters of Long Island Sound. Mr. Minei has been an active committee member for five years.

Todd Peterson, facilitator of the AMS Center's Water Stakeholder Committee invited stakeholders, EPA participants and the guest speaker to introduce themselves and to identify their professional affiliations. Mr. Peterson reviewed the meeting's agenda (attached).

Biomonitoring Technologies for Detecting Contaminants in Water

Dr. William van der Schalie of the U.S. Army Center for Environmental Health Research (USACEHR) discussed biomonitoring for contaminants in water. Dr. van der Schalie's presentation responded to a long-standing interest on the part of the AMS Center in pathogen detection. Dr. van der Schalie described USACEHR's mission of research, development, testing and evaluation to protect service men and women against food and water contamination. USACHER has a goal of reducing test turnaround times from approximately 24 hours to less than four hours. Dr. Tom Gargan, an USACEHR researcher and member of the AMS Center Water Stakeholder Committee, is managing the development of field test kits to protect troops from food and water contamination. USACEHR is researching instruments for the rapid assessment of microbial contaminants including *E. coli* and other fecal bacteria as well as the rapid analysis of chemical contaminants such as organophosphate and carbamate pesticides. USACEHR is also developing environmental biomonitors to rapidly detect environmental toxicants in water supplies and treated effluent.

USACEHR is linking biomonitoring with chemical monitoring. Automated biomonitoring systems developed by USACEHR continuously track the responses of living systems. These biomonitors provide an alarm when toxicity is detected, triggering immediate water sampling and analysis.

Dr. van der Schalie reported that automated biomonitoring can be applied to monitor non-point-source pollution, point-source discharges, spills of hazardous materials, biotoxins (for example from toxic algal blooms) and intentional poisoning of water supplies. He said that chemical monitoring might be sufficient to test for a specific contaminant for

example Sarin. But chemical monitoring may not be sufficient to test for a broad spectrum of chemicals. Stakeholders Roy Spalding and Vito Minei noted the need to measure pharmaceuticals in water.

Biomonitors are deployed in rivers above and below wastewater treatment plants and at the intakes for water treatment plants. They were widely deployed in Europe in conjunction with on-line chemical monitors following a catastrophic spill from the Sandoz Chemical Company on the Rhine River in 1986.

Most biomonitors that have been developed are for monitoring water. However, Dr. Jerry Bromenshenk of the University of Montana has used honeybees to monitor industrial air pollution from copper smelters as well as to locate the airborne chemical constiyuents of explosives such as TNT. A number of aquatic biomonitors are commercially available. Dr. van der Schalie has compiled a list of 12 vendors. Devices are commercially available to monitor bacteria (Mictrotox OS, which measures light output by luminescent bacteria, an indicator of metabolic rate). Other commercially available biomonitors make use of the following:

- Algae. The DF-Algae Test measures delayed fluorescence, an indicator of photosynthesis and is effective in detecting herbicides at extremely low levels.

- Daphnia. The Daphnia toximeter tracks Daphnia swimming behavior and is widely used in Europe to monitor surface water.

- Clams. The "Musselmonitor" tracks clamshell openings and closings in response to contaminants in water.

- Fish. The "BehavioQuant" system tracks fish swimming behavior. The Real-Time Environmental Protection System (REPS) developed at USACEHR continuously and automatically tracks the ventilation and movement patterns of bluegill fish. Aberrations in normal patterns trigger an alarm and immediate sampling for chemical analysis. This system is being used to protect the quality of the water for the U.S. Army installation at Ft. Detrick, Maryland, to evaluate the effectiveness of the treatment of wastewater being discharged into the Patuxent River and to monitor for *Pfiesteria* and other water quality perturbations in other tributaries to Chesepeake Bay..

Dr. van der Schalie noted that the REPS system is best for detecting acute as opposed to chronic toxicity. He cited high rates of response by fish to specified levels of 21 chemicals. He also pointed out the need to link a biomonitored response with a tiered analytical response.

He said that biomonitors provide early warning of developing toxicity and "real-time," continuous information. They identify toxicity from unsuspected chemicals, and integrate combined effects from multiple chemicals. Their use serves to enhance the awareness of toxicity on the part of operators of water systems. Biomonitors also help address the public's concerns about the effectiveness of wastewater treatment.

The sensitivity of biomonitors, Dr. van der Schalie noted, is chemical- and concentration-specific. Biomonitors identify the presence of toxicants but not the cause. The reliability of biomonitors depends on experiencing minimal downtime and false alarms.

In conclusion, Dr. van der Schalie quoted a mentor in saying "Only living organisms can detect toxicity." Biomonitors, he said, provide a broad-range evaluation of toxicity. Biomonitors complement, but do not replace analytical chemical test. Commercial biomonitors are available now.

Dr. van der Schalie saw a possible role for the ETV program in meeting the need to establish standards and criteria for comparison among biomonitoring devices. Stakeholder Geoff Scott recommended convening a review panel on biomonitors that would include developers and vendors of these devices. A matrix showing vendors and their tools and technology users and their needs should be developed according to stakeholder Alan Mearns. Stakeholder Rick Sakaji suggested convening an expert panel on biomonitoring to serve as a liaison between the users and developers of these technologies. Stakeholder Ken Wood pointed out that the sensitivity of these devices is important. False alarms, he said, will seriously damage the credibility of biomonitors.

The Alliance for Coastal Technology

Dr. Geoff Scott, a member of the AMS Center Water Stakeholder Committee and Acting Director of NOAA's Center for Coastal Environmental Health and Biomolecular Research discussed the Alliance for Coastal Technology. Responding to the fact that there have been no performance standards for technology to remotely sense ocean conditions, NOAA has entered into partnership with the University of Maryland and others to evaluate monitoring technologies. He sees a unity of purpose between this emerging program and the ETV program's AMS Center. He recommends a presentation on the Alliance for Coastal Technology at the committee's next meeting in the first quarter of 2003.

In addition, Dr. Scott described three studies with which he is involved to monitor the environmental effects of pesticides in estuarine and nearshore coastal waters. These pesticides are endosulphane, which he said kills more fish than all other insecticides combined, Fipronel, an endocrine disruptor in crustaceans, and atrazine. Dr Scott reported that atrazine does not kill plants or algae; it stresses them, allowing bacteria on them to flourish. Clams and oysters that eat plants affected by atrazine don't grow or reproduce.

Dr. Scott is particularly interested in the "edge of field" effects of these pesticides. He is preparing to run an experiment to monitor the environmental affects of atrazine when combined with the fertilizer phosphorous. Dr. Scott is also examining the environmental effects of mosquito control pesticides.

Stakeholder Vito Minei noted that Suffolk County, Long Island, New York will conduct a $2 million study of spraying and ditching to control mosquitoes.

Next Technology Categories for Verification

Karen Riggs, Battelle program manager for the AMS Center, said that in order to be considered for verification a category of technology, as in the past, must meet certain requirements:

- The technology category must address an important need as identified by EPA and stakeholders
- Technologies within that category must be commercially available
- The technology category must be possible to verify with reasonable effort
- Verification partners must exist.

Ms. Riggs reviewed the technology categories that stakeholders have identified in previous meetings as worthy of consideration for verification. These categories include:

- Rapid pathogen detectors

- On-line phosphate monitors
- Groundwater velocity monitors
- Detectors of endocrine disruptors and pharmaceuticals
- Down-hole, real-time sensors
- Devices to measure Carbon 13 cycling
- Biomarkers/tissue samplers.

Ms. Riggs reported that planning is now under way for the verification of multi-parameter water probes, pathogen detectors and ion selective electrodes. She noted that Jeff Myers of Battelle would report later in the meeting on the verification status of multi-parameter water probes.

During the last Water Stakeholder Committee meeting in Coeur d'Alene, Idaho, in light of the zinc and lead contamination of the Coeur d'Alene River and Coeur d'Alene Lake, stakeholders suggested examining ion specific electrodes to detect zinc, lead, cadmium and copper with a secondary emphasis on nitrate and ammonium.

Battelle has identified the following possible vendors of ion selective electrodes:

- Sentek
- Weiss Research
- Electrodes Direct
- Mettler Toledo
- Thermo.

In terms of portable water analyzers for arsenic, Ms. Riggs reported that two additional vendors have shown interest in verification testing. As a result, the AMS Center is considering a second round of testing, and is seeking additional vendors as well as verification partners.

Ms. Riggs said that since the last Water Stakeholder Committee meeting in October 2001, a number of other companies have approached the AMS Center concerning the possible verification of these vendors' technologies. These vendors include:

- Dascore, which has designed a device for the continuous monitoring of chlorine, chloramines, dissolved oxygen, pH, conductivity, redox potential and temperature in finished water, source water and waste water (final effluent)
- Sensicore, which has developed a "lab on a chip" to monitor the ionic chemistry of water
- PerLorica, with its "water eye virtual water system manager" that gathers sensor data on turbidity, chlorine, temperature and other parameters to assess a water system's status. This system displays data and charts trends.
- Chemetrics, which offers a range of water testing kits.

In conclusion, Ms. Riggs suggested that water monitors related to homeland security and soil monitors might be categories of technologies for consideration by the committee and the AMS Center in the future.

Stakeholder Roy Spalding said that in relation to ion selective electrodes it's important to document selectivity and responsiveness in the presence of interferents. Stakeholder Alan Mearns asked about the applicability of ion selective electrodes in salt water, for example to assess ballast water. Stakeholder Ken Wood said that providing a probe is one thing but providing a field-deployable system is another matter. What is needed, he said, is an ion selective electrode

system. Mr. Wood noted that there are vendors of these systems in Europe and Asia. He offered to provide a list of vendors. He said that multinational corporations have bought the smaller companies that make these types of devices. Vito Minei stressed his interest in durable, field-deployable devices. Stakeholder Geoff Scott said tests should be conducted in the most troublesome, least efficient setting to ascertain the technology's capabilities. He stressed the importance of durability.

Dr. Spalding said that colorimetric tests are available for assessing nitrate, ammonia, etc. as well as ion selective electrodes. Mr. Minei commented that the testing may be too slow and results vary with the time of year.

Dr. Mearns said that the agencies involved in the Coeur d'Alene/Silver Valley, Idaho cleanup might be partners in the verification of ion selective electrodes. Mr. Minei said that the Division of Environmental Quality of Suffolk County, New York, which he directs, would field test ion selective electrodes and provide laboratory back up. Stakeholder Rick Sakaji suggested approaching the Water Environment Research Foundation and the American Water Works Association as possible partners in the verification of ion selective electrodes. Stakeholder John Carlton commented that USGS might be a partner in this effort. Mr. Minei said that USGS, at their Colorado operations, does their own testing of monitoring devices. Dr. Spalding said a point of contact at USGS is Don Goolsby.

Mr. Wood and Dr. Scott said they are interested in working further on the verification of ion selective electrodes. Dr. Scott said he is particularly interested in ion selective electrodes for the detection of copper. Dr. Sakaji called for the development of standards for these technologies concerning detection limits and accuracy. In terms of verifying standards and methodologies, Dr. Scott made reference to the National Institute of Standards. He identified Paul Becker as a point of contact there.

Ms. Riggs said that the AMS Center is planning a second round of tests for arsenic detectors. The first round of testing produced a lot of false negatives. Stakeholder Marty Link said that it would be very valuable to do a second round of tests.

Ms. Riggs said that she hoped that the vendors who participated in the first round of testing would examine the results and make improvements in their technologies.

Dr. Scott observed, "There's a lot of misinformation about what people are selling." Dr. Mearns recommended developing a buyer's guide: "Here are 10 questions you need to ask about the performance of a technology." U.S. EPA ETV Program Director Teresa Harten said that these are reasons to make technology test protocols available on the ETV website. Dr. Mearns advocated developing a one-page procedure for evaluating a technology. As an example, he pointed to the development of criteria and guidelines for bioremediation technologies. Ms. Riggs said that in some cases she is amazed that vendors have not done internal testing.

Stakeholder Christine Kolbe said that the state of Texas has committed itself to buying real-time, on-line monitors for ammonia and phosphate.

Dr. Sakaji said that the CalFed partnership/California Department of Water Resources (Delta monitoring) might be a partner for ETV verification tests.

Recommendations for New Stakeholder Committee Members

The Water Stakeholder Committee provided recommendations for new members in four categories:

- Citizen Monitoring/Environmental Groups
- Insurance/Underwriting/Financial
- Soil/Sediment Monitoring
- All Around Good Committee Member.

Battelle will follow up on the committee's recommendations.

Next Meeting

The committee's next meeting will be in March 2003 in Florida.

ETV FORUM

Water Stakeholder Committee members joined participants in the National Monitoring Conference 2002 in a forum on the ETV program. Program Director Teresa Harten opened the session by reporting on the program's status.

ETV Program Update

Ms. Harten said that the ETV program came out of the need to increase the rate of innovation for environmental technologies. In the early 1990s, new technologies faced a lack of credibility and a slow rate of acceptance and use. A way was needed to address the aversion to the risk of new technologies on the part of technology purchasers and permitters. EPA's *National Performance Review* and *Bridge to a Sustainable Future* called for EPA to establish a technology verification program, which the agency initiated in October 1995.

Ms. Harten said that the purpose of the ETV program is to provide credible performance information for commercially ready environmental technologies to speed their implementation for the benefit of vendors, purchasers, permitters and the public.

The ETV program operates with public-private partnerships to provide objective testing of technologies. Battelle is the EPA's partner in the Advanced Monitoring Systems Center. Stakeholder committees help select categories of technologies for verification, develop protocols for testing and review test results. EPA provides oversight to ensure scientific relevance, fairness and consistency among the partnering organizations. EPA is committed to communication and outreach concerning the verification program. To this end, the agency has established the ETV website, www.epa.gov/etv. In addition, the AMS Center regularly publishes a newsletter concerning the verification of air and water monitoring technologies.

Ms. Harten said that ETV is a voluntary program that produces high quality, independently verified data about the performance of commercially ready technologies. ETV does not approve or certify technologies. Vendors of technologies may use results of performance testing in their marketing.

Ms. Harten reviewed the steps in the verification process. She said that the ETV program, now in its fifth year of operation, is comprised of six technology centers:

- ETV Advanced Monitoring Systems Center (Battelle is the EPA partner)

- ETV Air Pollution Control Technology Center (Research Triangle Institute)
- ETV Greenhouse Gas Technology Center (Southern Research Institute)
- ETV Drinking Water System Center (National Sanitation Foundation)
- ETV Water Protection Technology Center (National Sanitation Foundation)
- ETV Pollution Prevention, Recycling and Waste Treatment Systems Center (in planning).

Between 1995 and 2000, the ETV program verified the performance of 111 technologies in a median time of 16 months and at a median cost of $95,100. Vendors from 41 states and nine foreign countries have participated through the end of March 2002. To date, 171 technologies have been verified.

In terms of the program's impact, an Association of State Drinking Water Administrators' survey in 2000 showed that 35 states are using or plan to user ETV protocols for in-state testing of technologies. Twenty-seven states plan to rely primarily on ETV reports for decision making and seven states are using ETV information in other ways. In a survey of technology vendors conducted by EPA, nearly all those who responded (77% of those sent surveys) were using or planned to use ETV information in product marketing. Eighty-five percent of vendors said verification would not be as valuable if EPA were not associated with it. Seventy-three percent believe customers will be impressed by ETV verifications. Seventy-five percent believe ETV addresses key questions for which customers need answers in making purchasing decisions.

Ms. Harten drew attention to lessons learned through the completion of the program's pilot period. She said stakeholders have proven to be important contributors to the ETV program in every area. Stakeholders have helped set priorities and have shaped the program's process, protocols and outreach activities. The pilot period showed that protocols for verification testing largely do not exist. She said that ETV protocols are a major scientific contribution to technology commercialization and are becoming international standards. In terms of cost, Ms. Harten said that ETV can verify technologies efficiently but not cheaply. Vendors will pay some, but not all, of the cost of verification. Public-private partnerships through cooperative agreements work. They combine flexibility with accountability. Ms. Harten pointed out that partnerships with private and federal organizations, states and nations are essential to the ETV program's continued success. She noted that rapid, web-based publication of all information was a key to market acceptance and vendor participation.

Ms. Harten stressed that the program will continue to operate in relation to the following values:

- Fairness
  1. Verification testing is available to all vendors of commercially ready technologies within defined categories.

- Credibility
  2. Verifications are conducted by objective, third-party testers.
  3. Protocols and test plans are publicly available and capable of reproduction.

- Transparency
  4. Methods and results are publicly available.

- Quality
  5. Quality management and data of acceptable level for verification.

Ms. Harten cited strong international interest in the ETV program and process. She noted that ETV training has been conducted in Taiwan, Thailand, Malaysia, India and the Philippines. As noted, ETV protocols are being used worldwide.

In the period between the 2001 and 2005, Ms. Harten sees increasing contribution from vendors and others. Vendor contributions increased from $0 in fiscal year 1996 to $712,500 in fiscal year 2000, and to $537,600 in fiscal year 2001. In a mature program, EPA and vendors will share the cost of developing generic protocols, of involving stakeholders, of quality assurance and of report writing and review. Vendors and others are expected to assume the cost of testing, data analysis and individual product outreach.

Ms. Harten sees potential for the ETV program to expand into the verification of technologies to combat terrorism, specifically devices for the decontamination of buildings and surface. She sees opportunities for expansion to include verifying technologies related to oil spills, wastewater treatment and water infrastructure. Opportunity also lies in broadening the scope of verification to allow longer testing for reliability, cost, and operation and maintenance requirements. Ms. Harten envisioned verification taking a systems approach to include life cycle analysis so as to answer the question: Is the technology an environmentally sound and sustainable product?

ETV Test of Portable Water Analyzers

Karen Riggs reviewed the verification test for portable water analyzers for arsenic. Four technology vendors participated in test conducted in October and November 2001 in or near Columbus, Ohio:

- Peters Engineering (AS 75 Arsenic Test Kit)
- Industrial Test Systems, Inc (Quick ^{TM})
- Envitop Ltd. (AS-Top Water Test Kit)
- Trace Detect (Nano-Band ^{TM} Explorer).

Battelle conducted a three-phase analysis with a laboratory test of prepared samples, tests of drinking water (tap water, well water and treated well water) and tests of freshwater from the Ohio River and Ohio Creek. Test parameters included accuracy, precision, linearity, method detection limit, matrix interference, operator bias, and rate of false positives/negatives. Battelle prepared draft reports of test results. Vendors and EPA have reviewed these draft reports, which have also been sent to peer reviewers.

Preliminary test results showed room for improvement for all technologies in terms of accuracy in measurement of drinking water by both technical and non-technical operators. One technology showed a 30% rate of false negative readings when operated by technical staff and an 85% rate of false negative reading when operated by non-technical staff.

In conclusion, Ms. Riggs reported that the qualitative nature of the test kits limited quantitative conclusions. Detection limits ranged from ~ 4 to ~ 30 ppb, or could not be determined. Operator technical background does not appear, in most cases, to significantly influence test results. Test kits were very portable and generally easy to use. The cost of the kits is in the hundreds-of-dollars range (for numerous analyses). Ms. Riggs said that the results of the verification test have implications for the use of the kits.

Peer review of verification reports will be completed and the reports will be posted on the EPA/ETV website (www.eap.gov/etv). Several additional vendors have expressed interest in verification. Ms. Riggs noted that the AMS Center is seeking verification partners, and is interested in verifying analyzers with the capability to distinguish arsenic species.

Verification Test of Multi-Parameter Water Probes

Jeff Myers of Battelle reported that verification testing of multi-parameter water probes will begin June 10, 2002 in cooperation with NOAA and four participating vendors. Testing will be conducted near the Center for Coastal Environmental Health and Biomolecular Research in Charleston, South Carolina. Stakeholder Dr. Geoff Scott is acting director of the Center and has helped organize NOAA's partnership in this project. Verification testing will be conducted in salt and fresh water and in a controlled setting ("mesocosm"). Charleston Harbor is the salt-water site and Lake Edmunds, a mile from the Center, is the freshwater site. The mesocosm is a 300-liter tank containing elevated sediment trays and stream channels. Seawater is pumped in and out of the mesocosm twice daily to simulate tidal flooding.

Mr. Myers reported that performance verification will involve testing for the following parameters:

- dissolved oxygen
- pH
- temperature
- conductivity
- nitrate
- Chlorophyll A
- turbidity.

Testing will be conducted for one month in salt and fresh water and one week in the mesocosm. In salt and fresh water Battelle and NOAA staff will carry out four days of intensive (i.e. every ½ hour for eight hours) sampling for reference analyses. Two of these four days will be at the beginning of the 30-day test period and two will be at the end. During the intervening days, staff will sample once a day. Four samples will be taken daily in the mesocosm. Performance factors to be verified include linearity, accuracy, precision, inter-unity comparison and pre- and post-test calibration results.

The following vendors have indicated that they will participate:

- General Oceanics
- Horiba
- Hydrolab
- YSI

Vendors will pay a verification fee of $17,000 and will train Battelle and NOAA staff in the use of vendors' instruments or will operate their own instruments.

Participation in National Monitoring Conference 2002

Following the completion of the AMS Center Water Stakeholder Committee meeting, members participated in conference sessions on a range of water quality monitoring subjects.

U.S. EPA Environmental Technology Verification Program

Advanced Monitoring Systems Center

Water Stakeholder Committee Meeting

May 21, 2002

Monona Terrace Conference Center
Madison, Wisconsin

Agenda

8:00 – 8:30 a.m.	Registration	Hall of Fame Room
8:30 a.m.	Welcome	Karen Riggs, Battelle Teresa Harten, EPA/ETV Program Director
8:30 – 8:45 a.m.	Introductions	
8:45 – 9:30 a.m.	Biomonitoring Technologies for Detecting Contaminants in Water	William van der Schalie, Ph.D. U.S. Army Center for Environmental Health Research
9:30 – 9:45 a.m.	Break	
9:45 - 10:30 a.m.	Monitoring for Physical, Chemical and Biological Parameters in Coastal Waters: The Alliance for Coastal Technology Program	Earle Buckley, Ph.D. North Carolina State University
10:30 - 10:55 a.m.	Next Technology Categories For Verification	Karen Riggs

10:55 – 11:30 a.m.	Recommendations for New Stakeholder Committee Members	Todd Peterson, Battelle
11:30 – 11:45 a.m.	Next Meeting/Committee Business	Todd Peterson
11:45 – 12 noon	Move to ETV Forum meeting room	
12 noon – 1:30 p.m.	ETV Forum in Conjunction with National Water Monitoring Conference 2002	(Including lunch) Rooms P & Q, Monona Terrace Conference Center
	❑ ETV Program Status	Teresa Harten
	❑ ETV Test of Portable Water Analyzers	Karen Riggs
	❑ ETV Test of Multi-Parameter Water Probes	Jeff Myers, Battelle
	❑ Future Technologies for Verification	Karen Riggs
1:30 – 5 p.m.	Participation in National Water Monitoring Conference 2002 Sessions	